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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
KLAUS SCHULTES, ET AL.	: EXAMINER: LE, H. T.
SERIAL NO: 10/539,509	:
FILED: DECEMBER 7, 2005	: GROUP ART UNIT: 1794
FOR: CORE AND SHELL PARTICLE FOR MODIFYING IMPACT RESISTANCE OF A MOULDABLE POLY(METH)ACRYLATE MATERIAL	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal of the Final Rejection dated January 12, 2009 of Claims 1-10. A Notice of Appeal, along with a two-month extension of time, was filed June 12, 2009.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Roehm GmbH & Co. KG, having an address Kirschenallee, 64293 Darmstadt, Germany.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

IIII. STATUS OF THE CLAIMS

Claims 1-10 stand rejected and are herein appealed. Claims 11-15 have been canceled.

IV. STATUS OF THE AMENDMENTS

An amendment under 37 CFR 1.116 was filed on April 10, 2009. An Advisory Action dated April 21, 2009 stated that the rejection under 35 U.S.C. § 102 had been withdrawn, thus indicating entry of the amendment.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

A summary of the claimed subject matter, as claimed in sole independent Claim 1, is mapped out below, with reference to page and line numbers in the specification added in **[bold]** after each element.

Claim 1 is drawn to a core-shell particle which has a core, a first shell and, optionally, a second shell, where: **[page 8, lines 21-23]**

i) the core comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units; **[page 9, lines 1-3]**

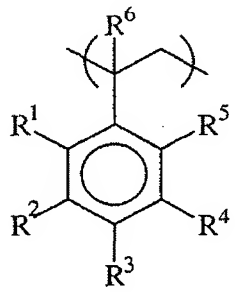
ii) the first shell has a glass transition temperature below 30° C; **[page 9, lines 5-6]**

iii) the second shell optionally comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units; **[page 9, lines 8-10]** wherein

iv) the first shell comprises, based on its total weight, the following constituents; **[page 9, lines 12-13]**

E) from 92.0 to 98.0 % by weight of (meth)acrylate repeat units and **[page 9, lines 15-16]**

F) from 2.0 to 8.0 % by weight of styrenic repeat units of formula (I)



(I)

where each of the radicals R^1 to R^5, independently of the others, is hydrogen, a halogen, a C_{1-6}-alkyl group or a C_{2-6}-alkenyl group and the radical R^6 is hydrogen or an alkyl group having from 1 to 6 carbon atoms, **[page 9, line 17 to page 10, line 5]**

where the percentages by weight of E) and F) give a total of 100.0 % by weight, **[page 10, lines 6-7]**

and in that

v) the radius of the core-shell particle inclusive of any second shell present, measured by the Coulter method, is in the range from above 160.0 to 240.0 nm. **[page 10, lines 9-12]**

VI. GROUNDS OF REJECTION

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as obvious over US 6,172,135 or WO 96/37531 (Fraser et al).

VII. ARGUMENT

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as obvious over Fraser et al.[1] That rejection is untenable and should not be sustained.

Sole independent Claim 1 herein is drawn to a core-shell particle which has a core, a first shell and, optionally, a second shell, where:

i) the core comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units;

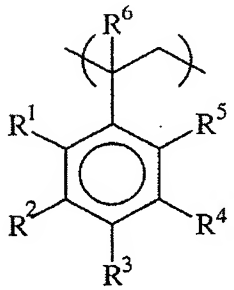
ii) the first shell has a glass transition temperature below 30° C;

iii) the second shell optionally comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units; wherein

iv) the first shell comprises, based on its total weight, the following constituents;

E) from 92.0 to 98.0 % by weight of (meth)acrylate repeat units and

F) from 2.0 to 8.0 % by weight of styrenic repeat units of formula (I)



(I)

where each of the radicals R^1 to R^5, independently of the others, is hydrogen, a halogen, a C_{1-6}-alkyl group or a C_{2-6}-alkenyl group and the radical R^6 is hydrogen or an alkyl group having from 1 to 6 carbon atoms,

where the percentages by weight of E) and F) give a total of 100.0 % by weight,

[1] Reference to Fraser et al in the text is to column and line of the US patent.

and in that

v) the radius of the core-shell particle inclusive of any second shell present, measured by the Coulter method, is in the range from above 160.0 to 240.0 nm.

The present invention is directed to a core/shell (meth)acrylate copolymer composition, which, in particulate form, is useful as an impact modifier in poly(meth)acrylate molding compositions. The presently claimed core-shell particles have a size that is defined in terms of a radius ranging from 160 to 240 nm. Thus, the particles have a diameter of 320 to 480 nm. On the other hand, in Fraser et al (column 4, lines 27-30), the multistage poly(meth)acrylate particles of the impact modifier disclosed therein have a particle size diameter in the range of 250 to 320 nm, particularly from 270 to 300 nm. In effect, Fraser et al teach away from the relatively larger particle size of the presently-claimed particle.

In addition, while the present invention requires that the first shell contain from 2 to 8 wt% of styrene repeat units, Fraser et al discloses 0 to 25 wt% of such units in their first shell (column 2, last two lines; column 3, lines 21-22 and 47-48; column 4, lines 9-10). Thus, Fraser et al does not require any styrene units in their first shell.

In addition, the comparative data in the specification herein demonstrate the significance of the presence of such styrene repeat units, especially with regard to improved low temperature impact resistance. The comparative data describe the formation of five different core-shell particles from three emulsions for each product. These core-shell particle products are identified in Table 1 as VB1, VB2, B1, B2 and B3. VB1 and VB2 are comparative products, because Emulsion II of product VB1 contains a greater than 50 % amount of styrene monomer relative to the acrylate and methacrylate comonomers, while Emulsion II of product VB2 contains no styrene. On the other hand, the three remaining monomer mixtures of Emulsions II of formulations B1 to B3 contain 5 % of styrene monomer. Upon formation of each of the five particle types, each particle type was blended

into a polymethylmethacrylate matrix material to form the five compositions, data for which are presented in Table 2. The impact resistance data on page 52 are particularly instructive because both the notched Izod impact strength data and the notched Charpy impact strength data show **improved** low temperature impact resistance for the low styrene content examples B1 to B3 of the present invention versus the two comparative compositions VB1 and VB2.

In the Advisory Action, the Examiner finds that the above-discussed range of 250 to 320 nm in Fraser et al is disclosed as "preferred," and therefore, it would have been obvious to employ, in effect, a higher diameter particle than 320 nm.

In reply, it is submitted that the term "preferably," as described at column 4, line 27 of Fraser et al, as a matter of English construction, would be interpreted as referring only to the term "spherical in appearance" appearing immediately thereafter. This is especially true, because Fraser et al discloses no broader range of particle diameters than 250 to 320 nm.

In the Advisory Action, the Examiner finds that the above-discussed comparative data does not establish non-obviousness because the particle radius for the comparative examples is also within the presently-recited range.

In reply, the comparative data is intended to show the significance of the styrene unit content in the first shell, not the significance of the particle radius. Indeed, since Fraser et al teaches away from the presently-recited particle radius, as discussed above, no *prima facie* case of obviousness has been made out.

For all the above reasons, it is respectfully requested that this rejection be REVERSED.

VIII. CONCLUSION

For the above reasons, it is respectfully requested that all the rejections still pending in the Rejection be REVERSED.

Respectfully submitted,

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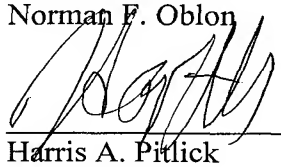
MAIER & NEUSTADT, P.C.
Norman F. Oblon



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CLAIMS APPENDIX

Claim 1. A core-shell particle which has a core, a first shell and, optionally, a second shell, where:

i) the core comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units;

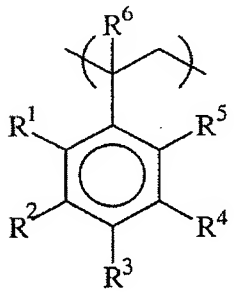
ii) the first shell has a glass transition temperature below 30° C;

iii) the second shell optionally comprises, based on its total weight, at least 75.0 % by weight of (meth)acrylate repeat units; wherein

iv) the first shell comprises, based on its total weight, the following constituents;

E) from 92.0 to 98.0 % by weight of (meth)acrylate repeat units and

F) from 2.0 to 8.0 % by weight of styrenic repeat units of formula (I)



(I)

where each of the radicals R^1 to R^5, independently of the others, is hydrogen, a halogen, a C_{1-6}-alkyl group or a C_{2-6}-alkenyl group and the radical R^6 is hydrogen or an alkyl group having from 1 to 6 carbon atoms,

where the percentages by weight of E) and F) give a total of 100.0 % by weight,

and in that

v) the radius of the core-shell particle inclusive of any second shell present, measured by the Coulter method, is in the range from above 160.0 to 240.0 nm.

Claim 2. The core-shell particle according to Claim 1, wherein, based in each case on its total weight,

i) the proportion of the core ranges from 5.0 to 50.0 % by weight,

ii) the proportion of the first shell ranges from 20.0 to 75.0 % by weight and

iii) the proportion of the second shell ranges from 0.0 to 50.0 % by weight,

where the percentages by weight give a total of 100.0 % by weight.

Claim 3. The core-shell particle according to Claim 1, wherein the core comprises, based in each case on its total weight,

A) from 50.0 to 99.9 % by weight of alkyl methacrylate repeat units having from 1 to 20 carbon atoms in the alkyl radical,

B) from 0.0 to 40.0 % by weight of alkyl acrylate repeat units having from 1 to 20 carbon atoms in the alkyl radical,

C) from 0.1 to 2.0 % by weight, of crosslinking repeat units and

D) from 0.0 to 8.0 % by weight of styrene repeat units of formula (I),

where the percentages by weight give a total of 100 % by weight.

Claim 4. The core-shell particle according to Claim 3, wherein the core comprises, based in each case on its total weight, from 80.0 to 99.9 % by weight of methyl methacrylate repeat units and from 1.0 to 20.0 % by weight of alkyl acrylate repeat units having from 1 to

4 carbon atoms in the alkyl radical, where the percentages by weight give a total of 100.0 % by weight.

Claim 5. The core-shell particle according to Claim 1, wherein the first shell comprises, based in each case on its total weight,

E-1) from 90.0 to 97.9 % by weight of alkyl acrylate repeat units having from 3 to 8 carbon atoms in the alkyl radical and/or alkyl methacrylate repeat units having from 7 to 14 carbon atoms in the alkyl radical,

E-2) from 0.1 to 2.0 % by weight of crosslinking repeat units and

F) from 2.0 to 8.0 % by weight of styrenic repeat units of formula (I),

where the percentages by weight give a total of 100.0 % by weight.

Claim 6. The core-shell particle according to Claim 5, wherein the alkyl acrylate repeat units having from 3 to 8 carbon atoms in the alkyl radical and/or alkyl methacrylate repeat units having from 7 to 14 carbon atoms in the alkyl radical are butyl acrylate repeat units and/or dodecyl methacrylate repeat units.

Claim 7. The core-shell particle according to Claim 1, wherein the core-shell particle has a second shell which, based in each case on its total weight, comprises

G) from 50.0 to 100.0 % by weight of alkyl methacrylate repeat units having from 1 to 20 carbon atoms in the alkyl radical,

H) from 0.0 to 40.0 % by weight of alkyl acrylate repeat units having from 1 to 20 carbon atoms in the alkyl radical and

I) from 0.0 to 8.0 % by weight of styrenic repeat units of formula (I),

where the percentages by weight give a total of 100.0 % by weight.

Claim 8. The core-shell particle according to Claim 1, wherein the core has a glass transition temperature of at least 30° C.

Claim 9. The core-shell particle according to Claim 1, wherein the core-shell particle has a second shell, which has a glass transition temperature of at least 30° C.

Claim 10. A process for preparing a core-shell particle according to Claim 1, which comprises:

polymerizing the monomers of each stage of said core, first shell and second shell under multistage emulsion polymerization conditions.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.